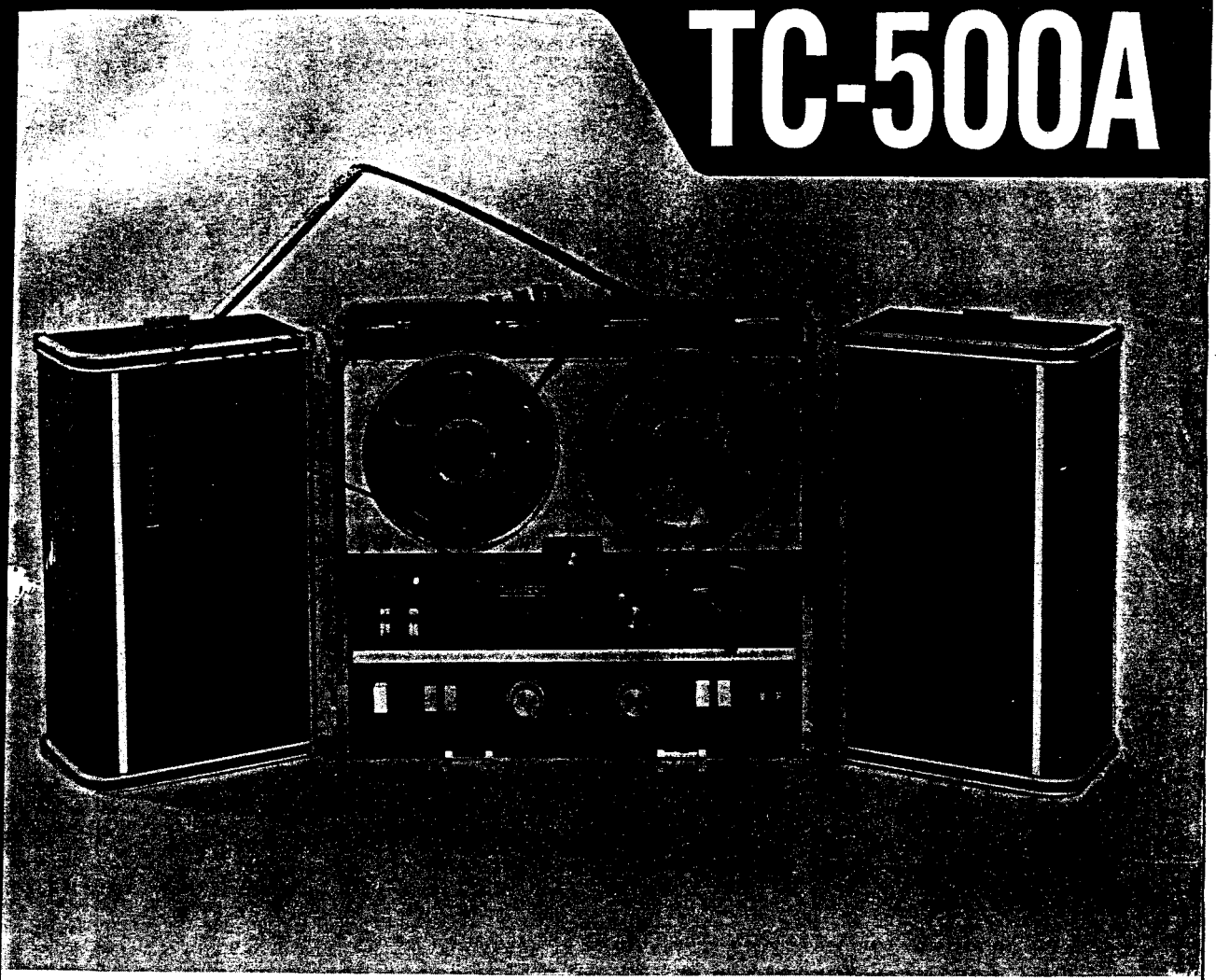
Original

TC-500A



Specifications

Power Requirement :	110 Watts 100V, 110V, 117V, 125V, 220V or 240V (Voltage selector provided in the set) AC 50 c/s or 60 c/s (Convertible by changing Capstan, Pinch Roller and Frequency Switch)
Tape Speeds :	Instantaneous selection, 7-1/2 ips or 3-3/4 ips (19 or 9.5 cm/s)
Track System :	4-Track
Reel Size :	Up to 7″ (18 cm)
Frequency Response :	30~18,000 cps at 7-1/2 ips (19 cm/sec) 30~13,000 cps at 3-3/4 ips (9.5 cm/sec)
Signal-to-Noise Ratio : (Per Channel)	50 dB (Measured by NAB standards)
Flutter and Wow :	Less than 0.15% at 7-1/2 ips Less than 0.20% at 3-3/4 ips
Bias Frequency :	Approx. 80 Kc
Level Indication :	Two VU Meters (calibrated to 0 dB at 12dB below saturation)
Input Circuit :	2-Microphone Jack (high impedance) 2-Auxiliary Input Jack (high impedance)
Output Circuit :	2-Monitor Speaker Jack (low impedance) 2-Line Output Jack (1.5 KΩ-0 dB) 1-Binaural Monitor Jack (low impedance)
Output Level :	Monitor Speaker (3 watts per channel)
Tube Complement :	2-12AD7 (or 12AX7), 2-6AU6, 2-6AQ5, 1-12BH7A, 1-6CA4
Weight :	Approx. 55 lbs. (25 Kg)
Dimensions :	18-1/2 W×16-3/16 D×12-1/4 H″ (470 W×410 D×310 H mm)

SONY®

SERVICING GUIDE

Original

Removal of Reel Panel

1) Remove 5 phillips head screws and chrome cup washers, being careful not to loosen plastic washers from decorative metal washers.
2) Lift panel from recorder.

Removal of Control Panel

1) Remove speakers.
2) Remove fuse and cap.
3) Place recorder face down on padded surface.
4) Remove 2 machine screws and washers under handle.
5) Remove 4 screws and washers from back of case.
6) The chassis can be removed from case.

Removal of Chassis from Cabinet

1) Remove head cover.
2) Remove speed selector knob.
3) Remove plastic cap from instant stop lever.
4) Remove function selector knob.
5) Remove MIC/play knobs—by pulling off.
6) Remove auxiliary knobs—by loosening set screw.
7) Remove phillips screw and washer under head cover and both tape guides.
8) Remove electronics bottom cover ; loosen 3 oval head phillips screws on rear of chassis ; cover will then slip out.
9) Remove 3 phillips head screws and washers—located just under lip of electronics chassis.
10) Lift control panel from recorder.

Alignment Procedure

The alignment is to be performed at a tape speed of 7-1/2 ips unless otherwise specified. Connect an 8 ohm load resistor in parallel with the VTVM terminals and connect the VTVM to the Speaker Output Jack (J_{104} and/or J_{204}). Set the Speaker ON/OFF Switch on.

1. Azimuth Alignment of the Playback Head

1) Align the upper edges of the Erase Head Core and Rec/PB Head Core and upper edge of Tape by turning the two Tape Guides located near the Heads. (H10 in Fig. 6)
2) Play back a 10 kc signal recorded on the first section of the SONY alignment tape " N-19-F1 ".
3) Adjust the azimuth alignment screw located on the right side of the Playback Head to obtain the maximum reading on the VTVM.
4) Perform the procedure 1) again.
5) Turn the Tape Guide (H10 L) clockwise by 30 degrees and the Tape Guide (H10 R) counter-clockwise by 30 degrees.
6) Perform the procedure 3) again.

2. Adjustment of Maximum Output

1) Turn the MIC/Playback Level Control R_{114} (R_{214}) (shown in Fig. 4) clockwise to the full.
2) Set the Bass Boost Switch off
3) Play back the 700 c/s signal recorded on the third section of the Alignment Tape "N-19-F1".
4) Adjust the Potentiometer R_{126} (R_{226}) (shown in Fig. 2) so that the VTVM indicates 4.47 V (2.5 W).

3. Adjustment of Frequency Responese

1) Play back the 700 c/s signal recorded on the third section of the Alignment Tape "N-19-F1"
2) Turn the MIC/Playback Level Control R_{114} (R_{214}) (shown in Fig. 4) until the VTVM indicates 0 dBs (0.775 V).
3) Play back the 10 kc signal recorded on the 4th section of the Alignment Tape and adjust the Playback Equalizer R_{107} (R_{207}) (shown in Fig. 2) so that the VTVM reading is within ± 2 dB.

4. Adjustment of Hum Balancer

1) Play back the 700 c/s signal recorded at the standard recording level on the second section of the alignment tape "N-19-F1".
2) Adjust the MIC/Playback Level Control R_{114} (R_{214}) (shown in Fig. 4) so that the VTVM indicates 2.83 V (1 W).
3) Remove the Alignment Tape.
4) Press the Record Button and adjust the Hum Balancer R_7 (R_8) (shown in Fig. 3) for the minimum reading on the VTVM.
5) Set the machine in "PLAY" mode.
6) Adjust the Hum Bucking Coil L_{102} (L_{202}) (shown in Fig. 3) for the minimum reading on the VTVM.

5. Playback Level Adjustment

1) Set the Speaker ON/OFF Switch off. Connect a VTVM to the LINE OUT Jack.
2) Play back a 700 c/s signal recorded on the third section of the alignment tape "N-19-F1" and turn the MIC/Playback Level Control R_{114} (R_{214}) (shown in Fig. 4) until the VTVM reads 0 dBs (0.775 V).
3) Turn the Playback Level Control R_{135} (R_{235}) (shown in Fig. 2) until the VU Meter reads 0 VU.

6. Recording Bias Adjustment

1) Set the machine in record mode.
2) Connect a VTVM across winding of the Rec/PB Head of Channel 1 (Channel 2).
3) Adjust the Trimmer Capacitor C_2 (C_3) shown in Fig. 2 so that the VTVM indicates between 90 V and 100 V.

7. Recording Level Adjustment

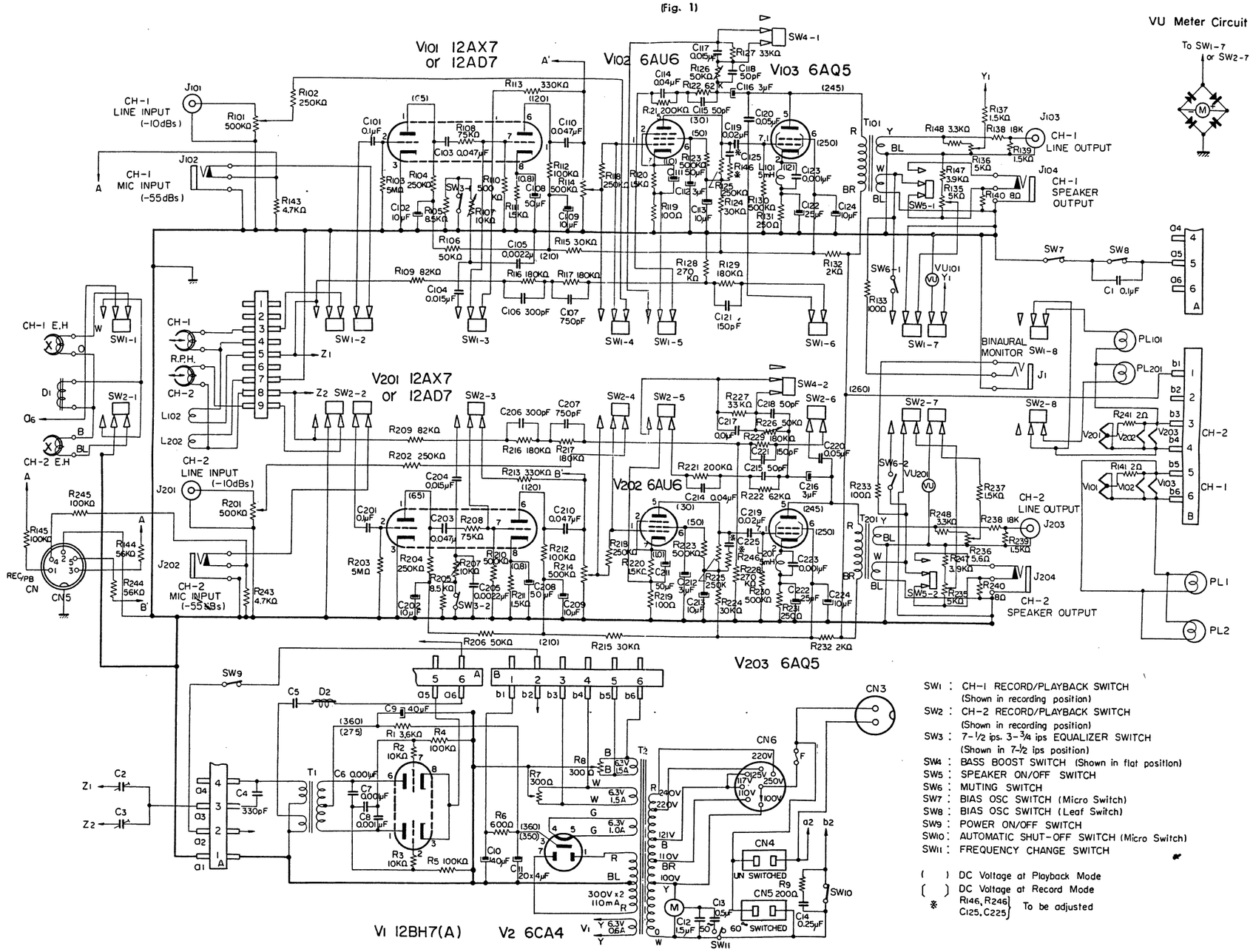
1) Set the Speaker ON/OFF Switch off.
2) Thread the SONY Alignment Tape "N-19-F1" on the machine.
3) Play back the 700 c/s tone which is recorded on the second section of the Alignment Tape.
4) Turn the MIC/Playback Level Control R_{114} (R_{214}) (shown in Fig. 4) so that the VU Meter indicates 0 VU.
5) Replace the Alignment Tape with a new Tape.
6) Set the machine in record mode.
7) Feed a 1 kc signal of -10 dBs from "LINE INPUT" Jack and turn the Aux. Recording Level Control R_{101} (R_{201}) (shown in Fig. 4) so that the VU Meter indicates 0 VU when the recorded signal is played back.
8) Set the machine in record mode. Turn the Recording Level Control R_{136} (R_{236}) (shown in Fig. 2) until the VU Meter indicates 0 VU.

Quick Guide to Simple Servicing

Trouble	Possible Cause	Service
Pilot lights out, motor inoperative	Open AC circuit	Check AC line connection to wall or chassis, check fuse, check On/Off switch. Check automatic shut-off switch.
No sound in playback when meters indicate signal	Defective speaker cords	Check speaker, cords and plugs for short or open circuits. Check SPEAKER SWITCH.
No sound in playback and meters do not indicate signal	Defective tubes in pre-amplifiers, head leads disconnected, defective rectifier 6AC4 tube, or defective power amplifier tube 6AQ5	Check pre-amplifier tubes 12AD7 and check lead connections of heads and at plugs in chassis. Check 6CA4 rectifier tube and check 6AQ5 amplifier tube.
Poor volume or dull sound in playback, poor frequency response	Dirt on head tracks	Clean heads.
Excessive tape hiss	Magnetized heads	Demagnetize heads.
Flutter and wow	Dirt and grease on capstan or pinch roller, slipping tape	Clean capstan and roller, lubricate motor, tighten capstan screw.
Crackling noise during volume adjustments	Dirty or defective volume controls	Contact competent technician or service station.
Pre or post echoes on recorded tapes	Print-through effect due to exposure of tapes to heat or magnetic fields	NOTE: To prevent print through, store tapes in cool place. Remove from storage space when operating the recorder.
Operates in playback but not in record, no meter indication	Defective microphones or microphone leads or input	Check if the recorder is in record position, check movement of record/playback switch, check microphone jacks or aux. input jacks.
Previously recorded sounds in background of newly recorded tapes	Poor erasure, dirt on heads	Clean erase head, check oscillator tube (12BH7A).

Schematic Diagram

(Fig. 1)

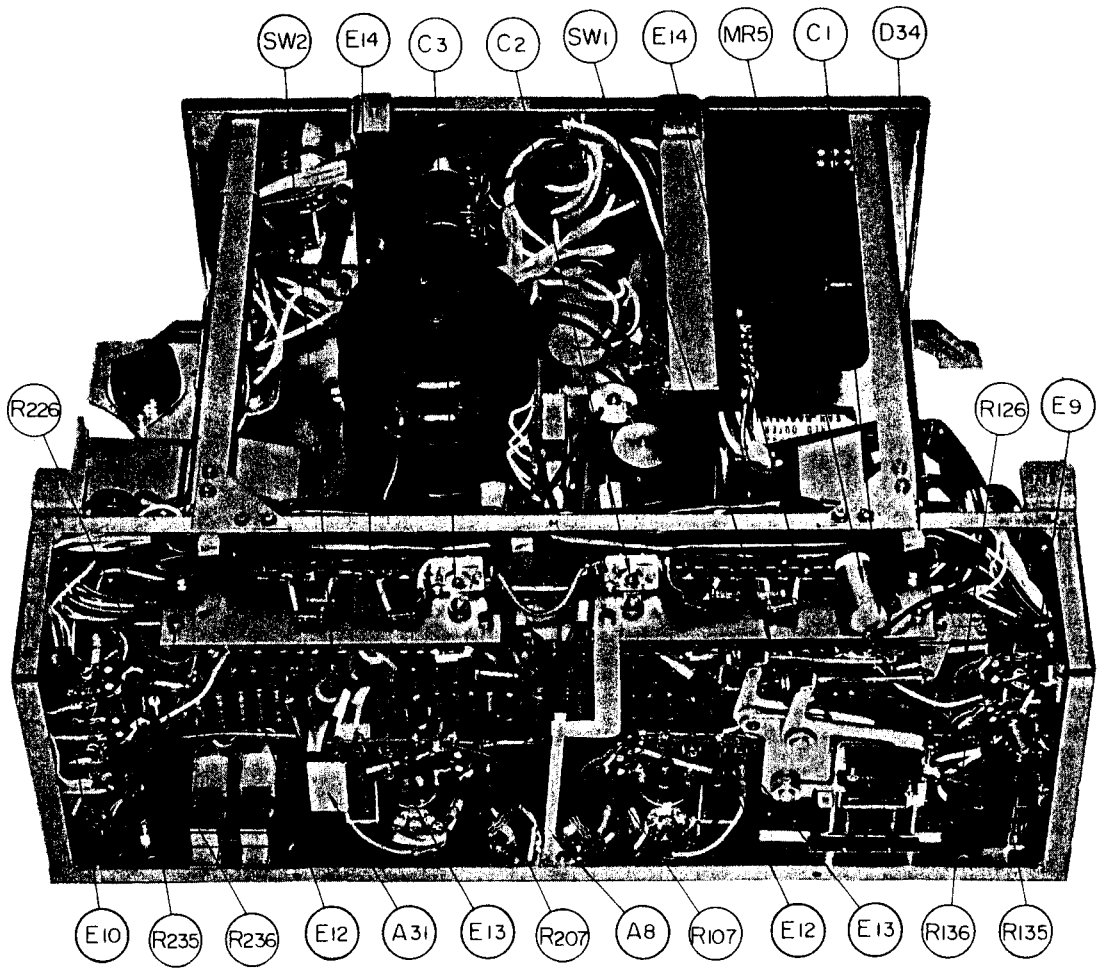


SW1 : CH-1 RECORD/PLAYBACK SWITCH
(Shown in recording position)
SW2 : CH-2 RECORD/PLAYBACK SWITCH
(Shown in recording position)
SW3 : 7-1/2 ips. 3-3/4 ips EQUALIZER SWITCH
(Shown in 7-1/2 ips position)
SW4 : BASS BOOST SWITCH (Shown in flat position)
SW5 : SPEAKER ON/OFF SWITCH
SW6 : MUTING SWITCH
SW7 : BIAS OSC SWITCH (Micro Switch)
SW8 : BIAS OSC SWITCH (Leaf Switch)
SW9 : POWER ON/OFF SWITCH
SW10 : AUTOMATIC SHUT-OFF SWITCH (Micro Switch)
SW11 : FREQUENCY CHANGE SWITCH

( ) DC Voltage at Playback Mode
[ ] DC Voltage at Record Mode
※ R146, R246 / C125, C225 To be adjusted

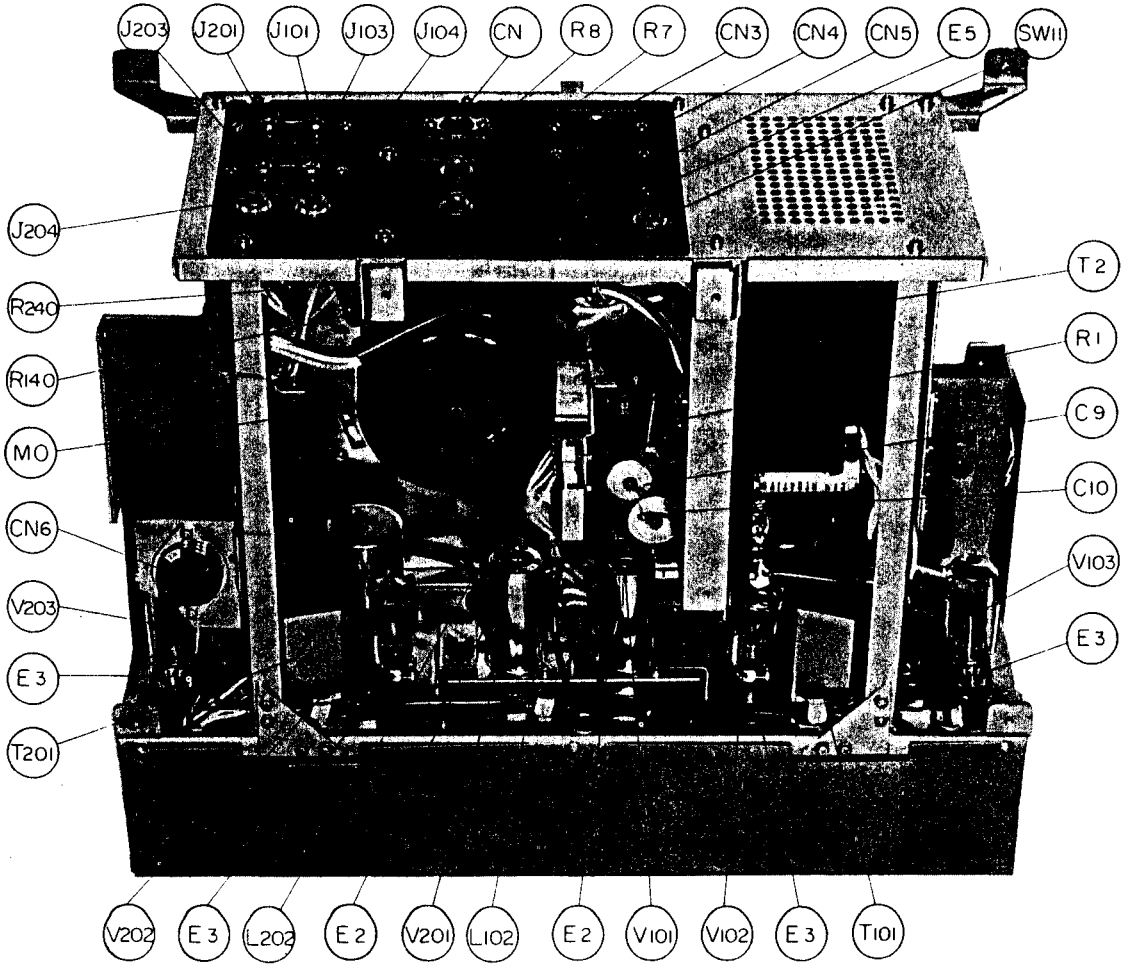
Bottom View of Amplifier

(Fig. 2)



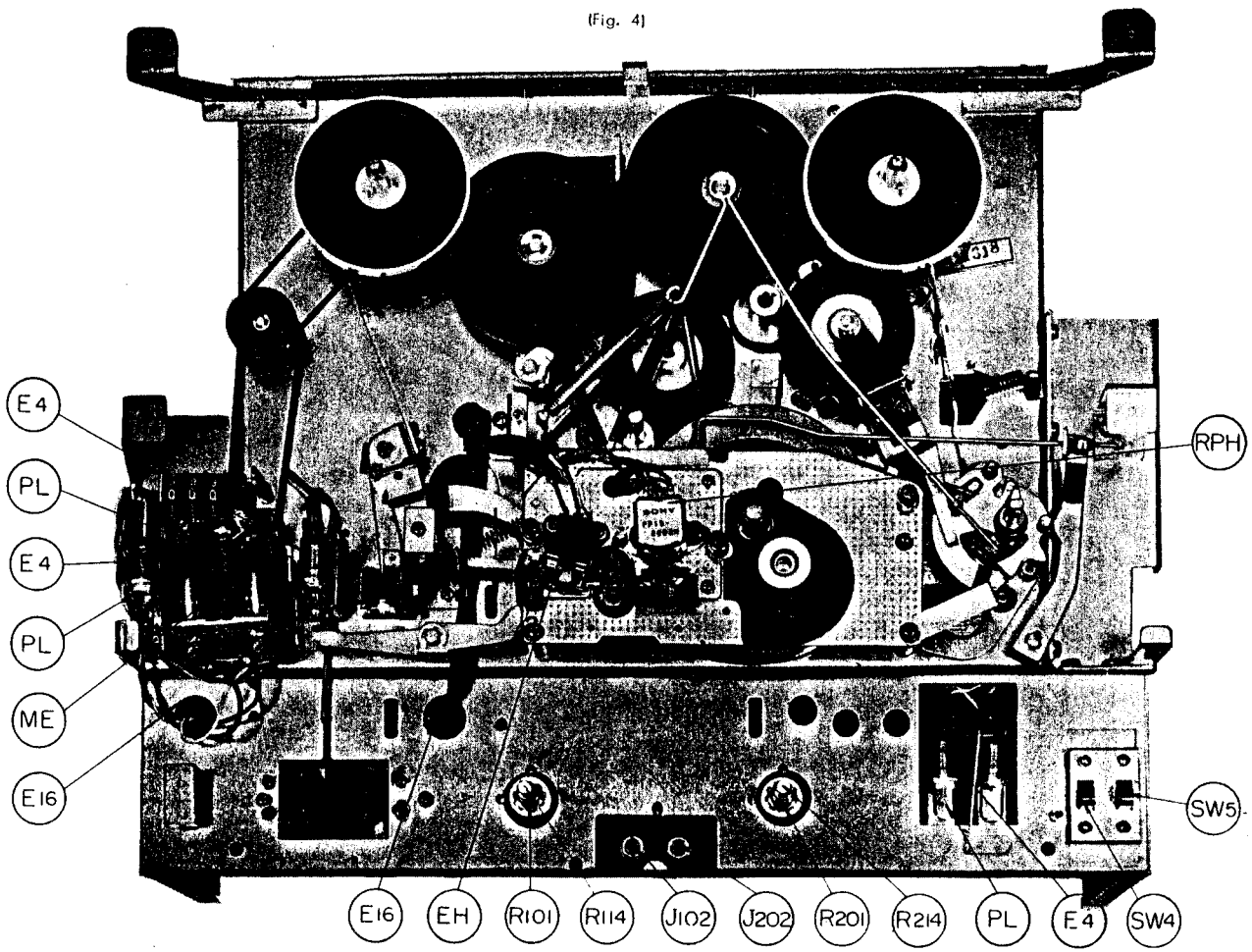
Location of Major Electrical Parts

(Fig. 3)



Tape Transport Mechanism

(Fig. 4)



Cabinet & Appearance Section

Parts List

Symbol No.	Description	Q'ty
1	Cabinet Ass'y, including	1
1-1	Cabinet	(1)
1-2	Cabinet Sash (A)	(2)
1-3	// // (D)	(2)
1-4	Plastic Sash Cover (A)	(2)
1-5	// // // (B)	(2)
1-6	Grip Handle Ass'y	(1)
1-7	Grip Handle Cover (Clear)	(1)
1-8	Grip Handle Mounting Bracket	(2)
1-9	Screw Bolt for Grip Handle	(2)
1-10	Rubber Handle Washer	(2)
1-11	Holding Plate for Grip Handle Bracket	(1)
1-12	Ventilator Funnel	(1)
1-13	Ventilator Grille	(1)
1-14	Lid for Connector Plate	(1)
1-15	Lock Metal for Connector Lid	(2)
1-16	Rubber Foot Stopper	(8)
1-17	Rubber Foot (Large)	(8)
1-18	// (Small)	(4)
1-19	Lid for AC Voltage Selector	(1)
1-20	Reinforcing Plate for Cabinet	(4)
1-21	Lock (Right)	(1)
1-22	// (Left)	(1)
1-23	Speaker Box (Right)	(1)
1-24	// (Left)	(1)
2	Specification Label	1
3	Escutcheon (Binaural Monitor)	1
4	Escutcheon Holding Plate	1
5	Defeat Chain	1
6	Control Panel Ass'y, including	1
6-1	Control Panel	(1)
6-2	Lamp Cap	(2)
6-3	Indicating Plate for Tape Speed	(1)
6-4	Ornamental Strip Holding Screw Post	(3)
6-5	Washer Ornamental Strip Holding Screw Post	(3)
6-6	Waseer for Ornamental Strip	(3)
6-7	Spacer for Lamp Cap	(2)
6-8	Ornamental Strip	(1)
7	Panel Spacer (Metal) for Control Panel	1
8	Washer for Panel Spacer (Control Panel)	1
9	Reel Panel	1
10	Head Cover Ass'y, including	1
10-1	Name Plate "SONY"	(1)
10-2	Head Cover Cushion	(1)
10-3	Setting Screw	(2)
11	Speed Selector Knob Ass'y, including	1
11-1	Face Plate	(1)
11-2	Setting Screw	(1)
12	ON-OFF Push Button Ass'y, including	1
12-1	Setting Screw	(1)
12-2	Nut for Setting Screw	(1)
13	Record Button Ass'y, including	2
13-1	Setting Screw	(2)
13-2	Nut for Setting Screw	(2)
14	Function Selector Knob Ass'y, including	1
14-1	Setting Screw	(1)
15	Volume Control Knob (Upper) Ass'y, including	2
15-1	Setting Screw	(2)
16	Volume Control Knob (Lower) Ass'y, including	2
16-1	Face Plate	(2)
16-2	Setting Screw	(2)
17	Fast Forward Knob	1
18	Instant Stop Lever Knob	1
19	Spring for Fast Forward	1
20	Spacer for Reel Mounting Screw	5
21	Nylon Washer for Reel Panel Mount	5
22	Tension Lever Guide	2
23	Washer for Cabinet	6
24	Speaker Box Right (Cabinet Lid) Ass'y, including	1
24-1	Sash (B)	(1)
24-2	// (C)	(1)
24-3	// (D)	(2)
24-4	Plastic Sash Cover (A)	(2)
24-5	// (B)	(2)
24-6	Buffle Board Holding Screw	(4)
24-7	Speaker Back Board	(1)
24-8	Speaker Grille Metal	(1)
24-9	Speaker Metallic Cover	(1)
24-10	Midrophone Bag	(1)
24-11	Stopper Washer for Rubber Foot	(2)
24-12	Cabinet Hinge	(2)
24-13	Speaker Holding Screw	(4)
24-14	Rubber Foot	(2)
24-15	Name Plate	(1)
25	Speaker Box Left (Cabinet Lid) Ass'y, including	1
25-1	Sash (B)	(1)
25-2	// (C)	(1)
25-3	// (D)	(2)
25-4	Plastic Sash Cover (A)	(2)
25-5	// (B)	(2)
25-6	Buffle Board Holding Screw	(4)
25-7	Speaker Back Board	(1)
25-8	Speaker Grille Metal	(1)
25-9	Speaker Metallic Cover	(1)
25-10	Microphone Bag	(1)
25-11	Stopper Washer for Rubber Foot	(2)
25-12	Cabinet Hinge	(2)
25-13	Speaker Holding Screw	(4)
25-14	Rubber Foot	(2)
26	Sash (E) for Speaker Box	2
27	Speaker Cord Packing for Speaker Box	2

Head Deck and Capstan Fly Wheel Section

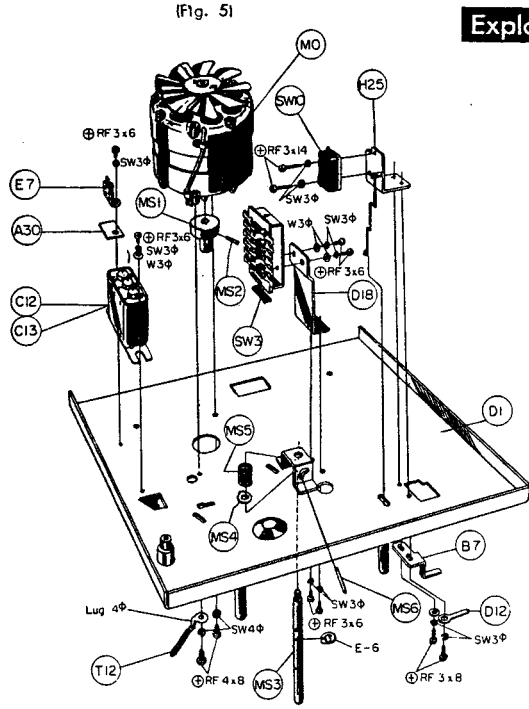
Symbol No.	Description	Q'ty
H1	Head Shield Plate for Erase Head	1
H2	Head Shield Plate for Rec./P. B. Head	1
H3	Head Pad for Erase Head	1
H4	// //	1
H5	Head Pad for Rec./P. B. Head	1
H6	Head Pad for Rec./P. B. Head. 8-820 724 23	1
H7	Head Deck Ass'y, including	1
H7-1	Head Deck	(1)
H7-2	Felt Cushion	(1)
H7-3	Pinch Lever Shaft	(1)

Parts List

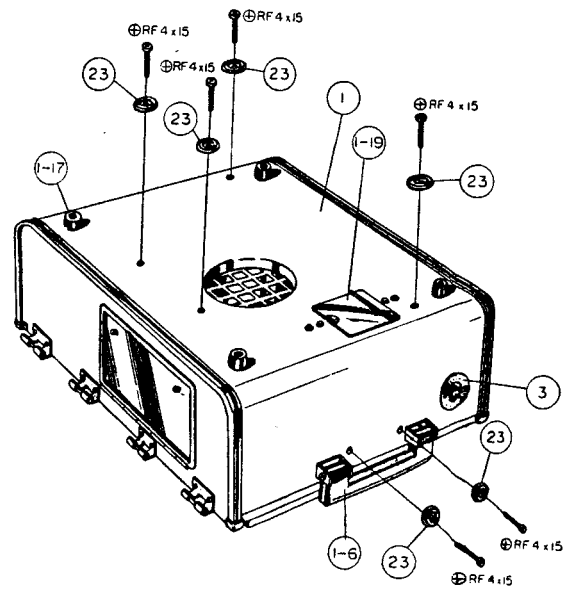
Symbol No.	Description	Q'ty
R106, 206	50 KΩ ½W Carbon	2
R107, 207	10 KΩ Semi-Fixed	2
R108, 208	75 KΩ ½W Carbon	2
R109, 209	82 KΩ ¼W 〃	2
R110, 210	500 KΩ ½W 〃	2
R111, 211	1.5 KΩ 〃 〃	2
R112, 212	100 KΩ 〃 〃	2
R113, 213	330 KΩ ¼W 〃	2
R114, 214	500 KΩ Aux. Input Level Control (Combined with R101(201))	2
R115, 215	30 KΩ ½W Carbon	2
R116, 216	180 KΩ ¼W 〃	2
R117, 217	180 KΩ 〃 〃	2
R118, 218	250 KΩ ½W 〃	2
R119, 219	100 Ω 〃 〃	2
R120, 220	1.5 KΩ 〃 〃	2
R121, 221	200 KΩ 〃 〃	2
R122, 222	62 KΩ 〃 〃	2
R123, 223	500 KΩ 〃 〃	2
R124, 224	30 KΩ 〃 〃	2
R125, 225	250 KΩ 〃 〃	2
R126, 226	50 KΩ Semi-Fixed	2
R127, 227	33 KΩ ¼W Carbon	2
R128, 228	270 KΩ 〃 〃	2
R129, 229	180 KΩ 〃 〃	2
R130, 230	500 KΩ ½W 〃	2
R131, 231	250 Ω 2W 〃	2
R132, 232	2 KΩ ¾W 〃	2
R133, 233	100 Ω ¼W 〃	2
R134, 234	—deleted—	
R135, 235	5 KΩ Semi-Fixed	2
R136, 236	5 KΩ 〃	2
R137, 237	1.5 KΩ ½W Carbon	2
R138, 238	18 KΩ 〃 〃	2
R139, 239	1.5 K 〃 〃	2
R140, 240	8 Ω 2W 〃	2
R141, 241	2 Ω ½W Wire Wound	2
R142, 242	—deleted—	
R143, 243	4.7 KΩ ¼W Carbon	2
R144, 244	56 KΩ 〃 〃	2
R145, 245	100 KΩ 〃 〃	2
R146, 246	10 KΩ 〃 〃	2
R147, 247	3.9 KΩ ¼W Carbon	2
R148, 248	3.3 KΩ 〃 〃	2
Capacitors		
C1	0.1 μF 400WV Oil Paper	1
C2	30~200PF Trimmer Capacitor	1
C3	30~200PF 〃	1
C4	330PF 1,000WV Mica	1
C5	0.5 μF 250WV MP (Tubular)	1
C6	0.001 μF 400WV Mica	1
C7	0.001 μF 〃 〃	1
C8	0.001 μF 〃 〃	1
C9	40 μF 〃 Electrolytic (Tubular)	1
C10	40 μF 350WV 〃 (〃)	1
C11	20 μF×4 450WV 〃	1
C12, 13	1.5 μF+0.5 μF MP	1
C14	0.25 μF 600WV Oil Paper	1
C101, 201	0.1 μF 100WV Mylar	2
C102, 202	10 μF 350WV Electrolytic	2
C103, 203	0.047 μF 200WV Mylar	2
C104, 204	0.015 μF 50WV 〃	2
C105, 205	0.0022 μF 〃 〃	2
C106, 206	300PF 250WV Polyethylene	2
C107, 207	750PF 〃 〃	2
C108, 208	50 μF 6WV Electrolytic (Tubular)	2
C109, 209	10 μF 350WV 〃	2
C110, 210	0.047 μF 200WV Mylar	2
C111, 211	50 μF 6WV Electrolytic (Tubular)	2
C112, 212	3 μF 350WV 〃	2
C113, 213	10 μF 〃 〃	2
C114, 214	0.04 μF 100WV Mylar	2
C115, 215	50PF 250WV Polyethylene	2
C116, 216	3 μF 350WV Electrolytic (Tubular)	2
C117' 217	0.015 μF 50WV Mylar	2
C118, 218	50PF 250WV Polyethylene	2
C119, 219	0.02 μF 100WV Mylar	2
C120, 220	0.05 μF 400WV Oil Paper	2
C121, 221	150PF 250WV Polyethylene	2
C122, 222	25 μF 15WV Electrolytic	2
C123, 223	0.001 μF 100WV Mylar	2
C124, 224	10 μF 350WV Electrolytic	2
C125, 225	200PF 250WV Polyethylene	2

Exploded Diagram

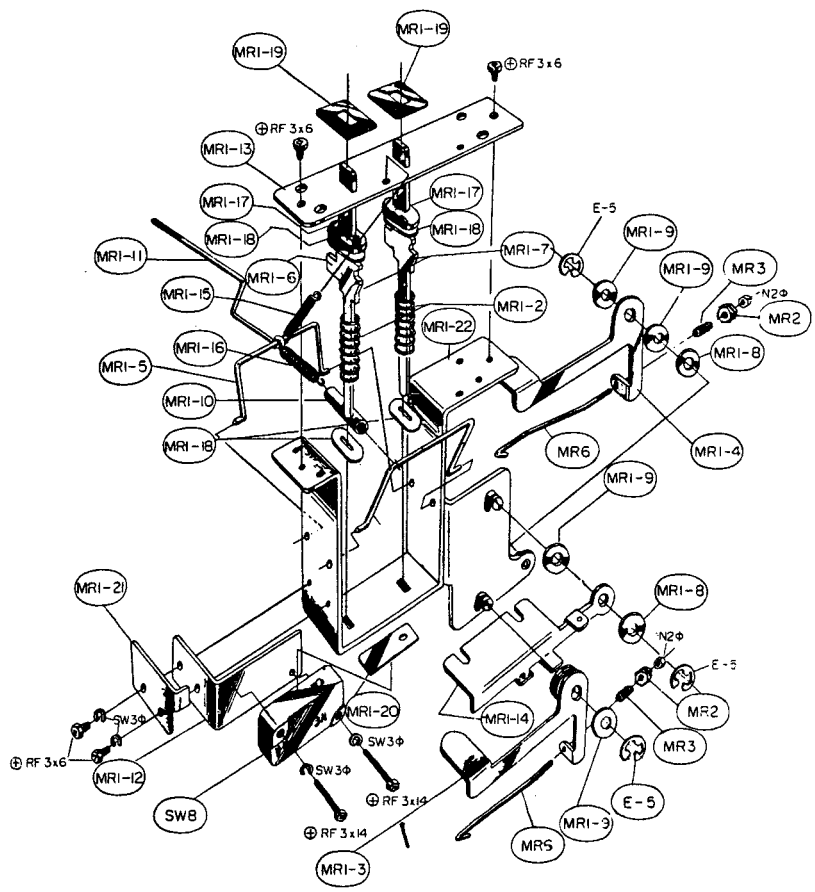
(Fig. 5)



(Fig. 6)

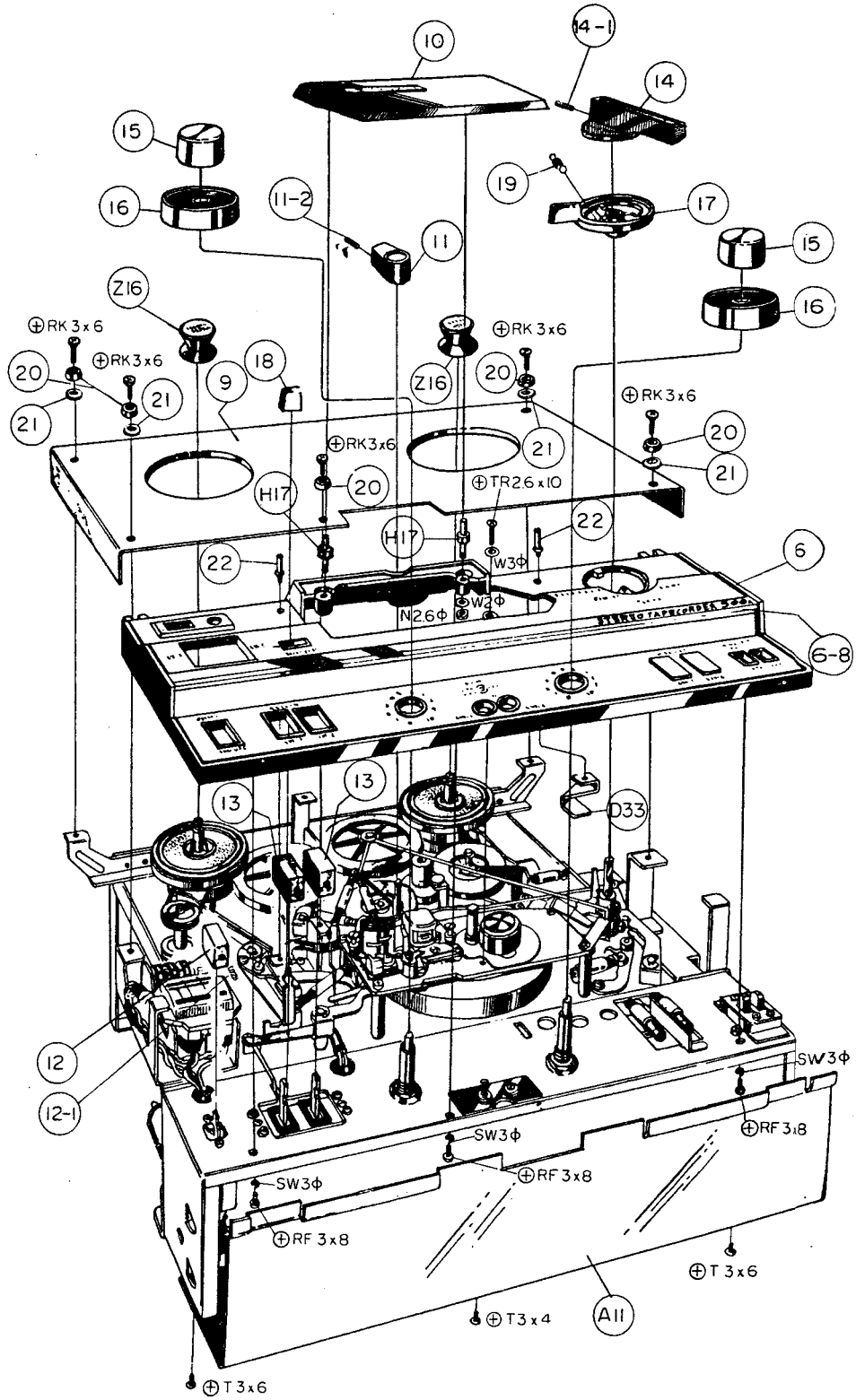


(Fig. 7)



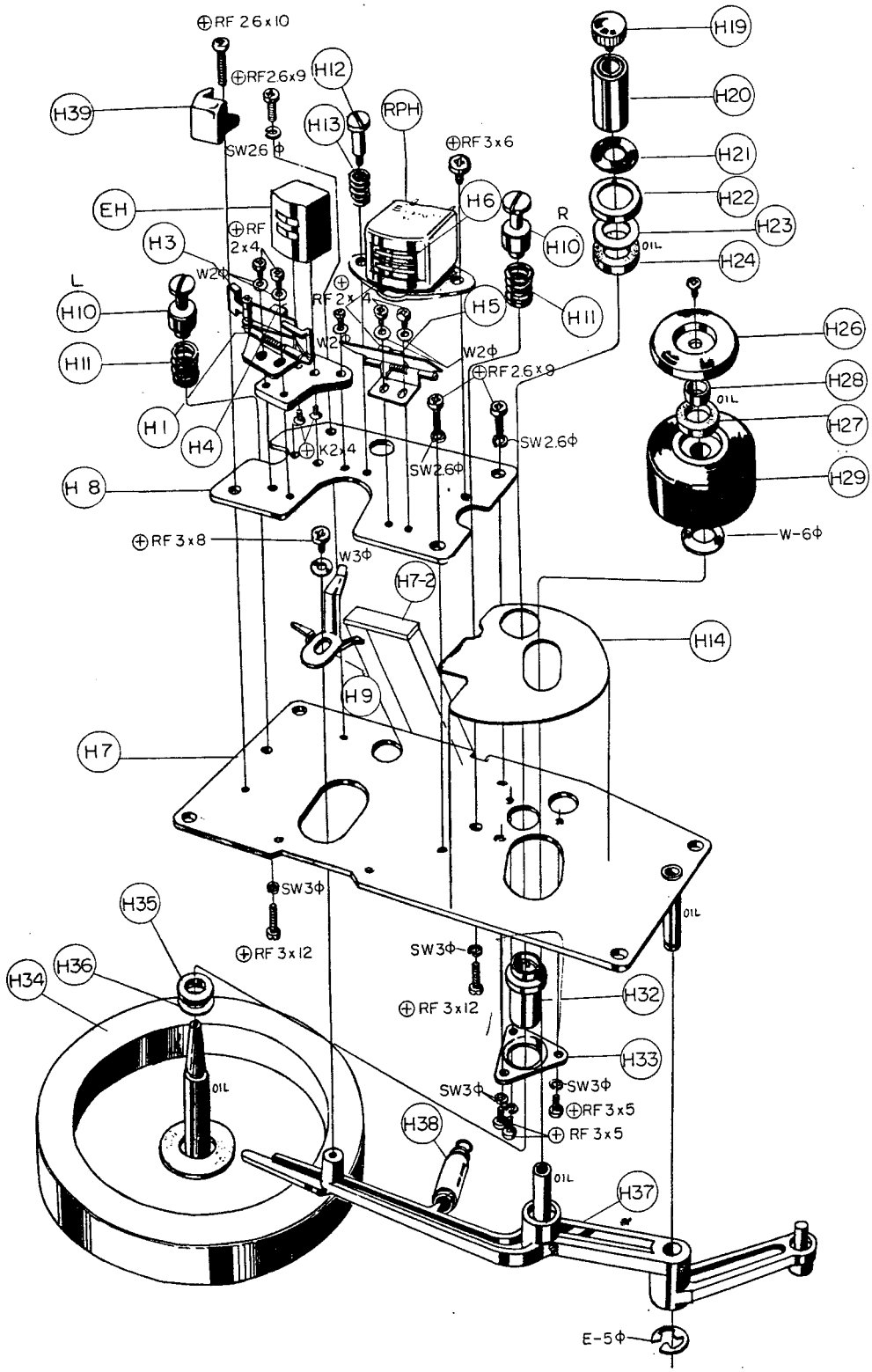
Exploded Diagram

(Fig. 8)



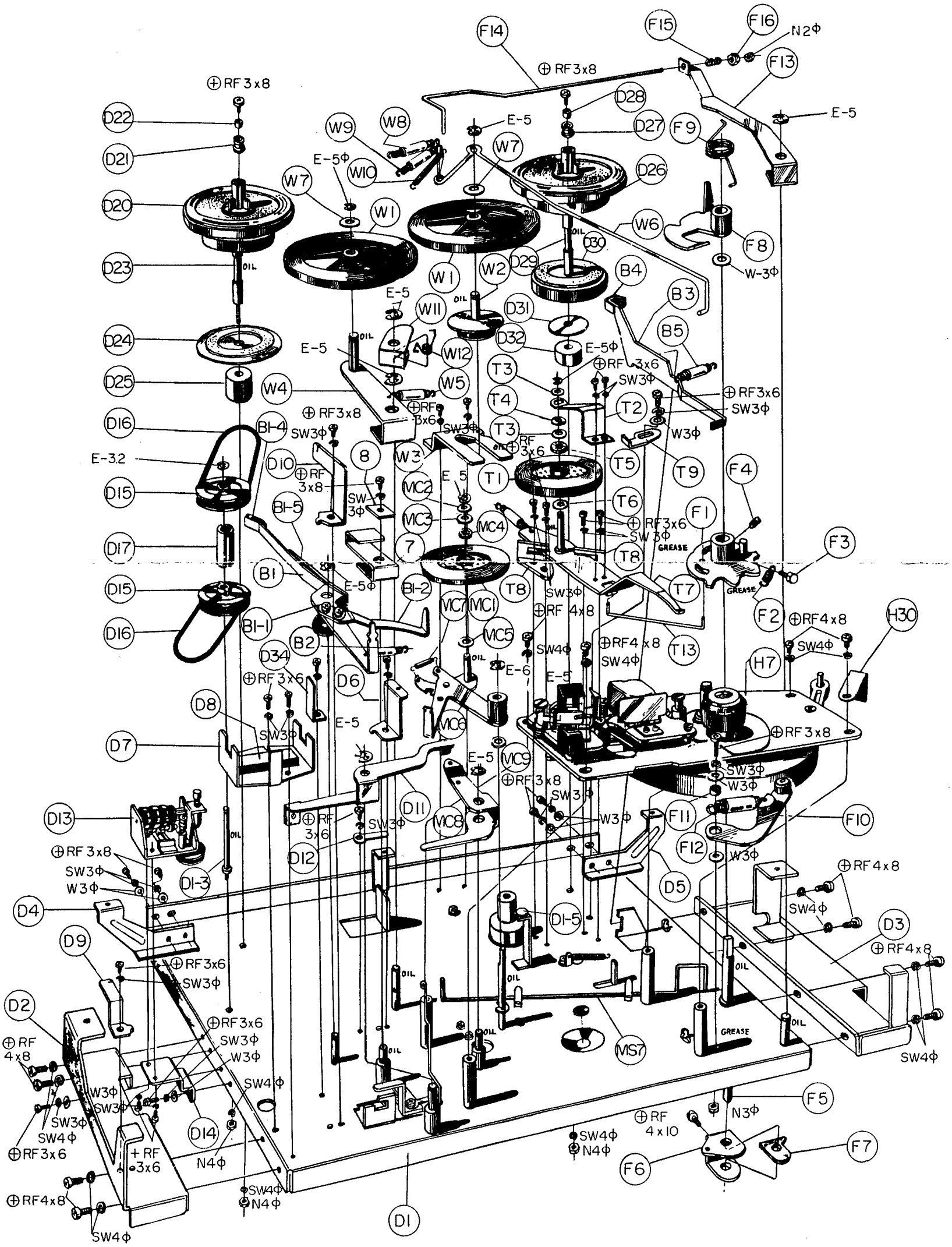
Exploded Diagram

(Fig. 9)



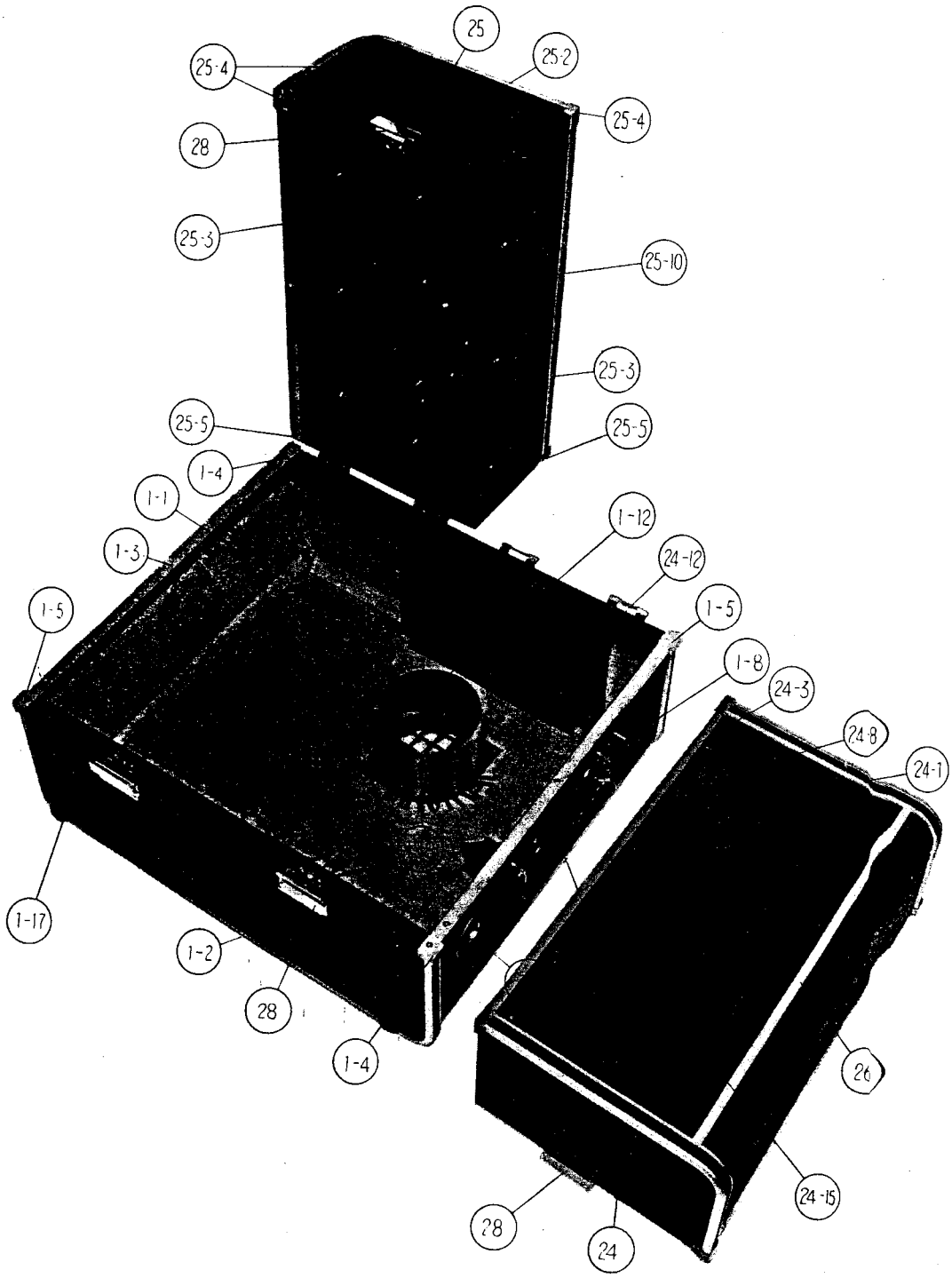
Exploded Diagram

(Fig. 10)

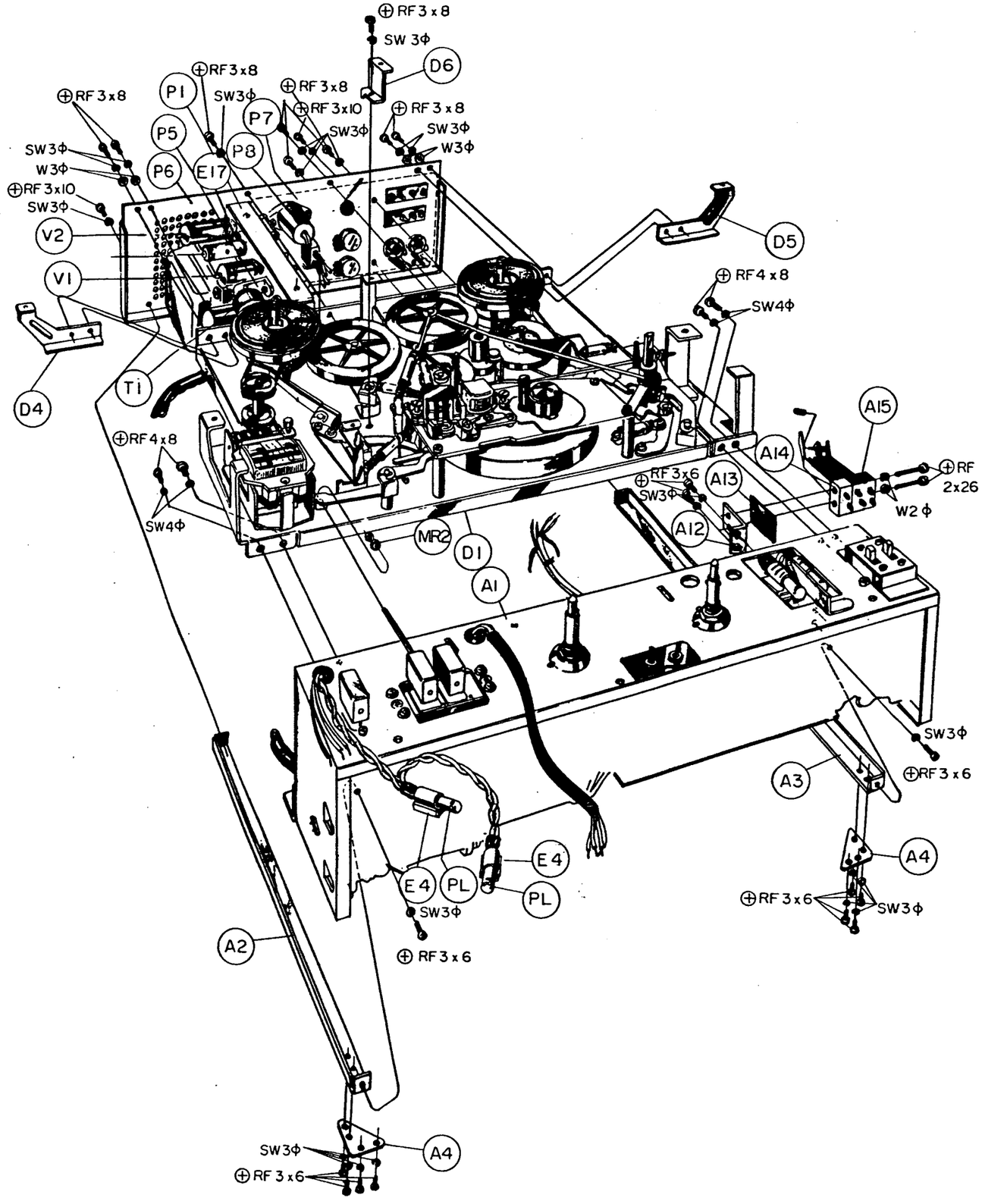


Cabinet Assembly

(Fig. 12)



SONY CORPORATION


⊕RF 3 x 8
SW 3φ
D6
⊕RF 3x8
P1
SW3φ
⊕RF 3x8
⊕RF 3x10
SW3φ
⊕RF 3 x 8
SW3φ
W3φ
⊕RF 3x8
P5
P7
P8
SW3φ
W3φ
P6
E17
⊕RF 3x10
SW3φ
V2
V1
D5
⊕RF 4 x 8
SW4φ
T1
D4
A15
⊕RF4x8
A14
⊕RF 3x6
SW3φ
A13
⊕RF
2x26
W2 φ
SW4φ
A12
MR2
D1
A1
SW3φ
A3
⊕RF 3 x 6
A4
E 4
PL
E 4
PL
SW3φ
⊕RF 3x6
⊕RF 3x6
SW3φ
A2
SW3φ
A4
⊕RF 3 x6